

and physiological factors rather than just the toxicity of these compounds. They point out that the 'deterrent receptors' found in many insects are broadly sensitive to many compounds not normally encountered by these insects and that this leads to rejection of novel diets, whether or not this rejection is ecologically or physiologically adaptive. This chapter is particularly stimulating because it provides an evolutionary context for our knowledge about the insect chemical receptor system.

J. S. Kennedy describes Dethier's experimental search for the existence of 'motivation,' an elusive concept related to the endogenous factors influencing an animal's response to a stimulus. Dethier ultimately rejected the concept as only a metaphor for emergent properties of more complex CNS integration. Kennedy uses the discussion to issue a warning that 'mentalist' or teleological language is still prevalent in the behavioral sciences. He argues that such terms are misleading impediments to understanding behavioral mechanisms. Although this warning is an old one, it bears repeating.

M. Rothschild presents data and qualitative observations of oviposition by *Pieris brassicae* and offers a tenuous, and by her own acknowledgement speculative, adaptationist hypothesis for this complex behavior. Her interpretations are not convincing, but this chapter serves as a reminder, to those currently involved in similar research, of the difficulties in interpreting the complexities and variability of insect behavior.

There are two chapters (C. Pfaffmann and L. M. Beidler), on mechanisms of vertebrate gustation and one (E. Stellar) describing a method of quantifying appetitive motivation in the rat. Although their inclusion is consistent with the general theme of the book, they seem somewhat out of place in a work otherwise devoted to insects. A more general treatment of vertebrate chemosensory research, including conceptual links to insects, would have been appropriate in a volume likely to attract more entomologists than vertebrate physiologists. L. M. Beidler comes closest to such a synthesis by including a comparison of the response attributes of several vertebrate taste receptors and those of the blowfly.

The diversity of topics included in this book reflects the remarkable breadth of Dr. Dethier's influence on behavioral, physiological, and evolutionary biology. The breadth of this small volume, however, makes it somewhat disjointed, and few readers will find all of the book interesting. Another problem, common to symposium volumes, is that some of the material is dated. Although most of the chapters have been revised since their presentation as papers, few references (13, by my count) are more recent than 1985.

A charming aspect of the book is the admiration of the authors for Dr. Dethier's research and for his fascination with insect behavior. This admiration is reflected in the quality of the individual chapters and provides continuity to this tribute to his work.—*S. D. Eigenbrode, New York State Agricultural Experiment Station, Geneva, New York 14456.*

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The Natural History and Behavior of North American Beewolves.—H. E. Evans and K. M. O'Neill. 1988. Comstock Publishing Associates, Ithaca, New York, vii + 278 pp. Cloth \$45.00, paper \$23.50 U.S.

The Natural History and Behavior of North American Beewolves, with some exceptions, follows the content pattern of H. E. Evans' similar books on sand wasps (1957, 1966). The treatise on beewolves places more emphasis on male behavior and male mating strategies than these earlier books.

A well-written Introduction gives an excellent overview of the biology not only of beewolves of the genus *Philanthus*, but also provides valuable information about male and female sphecid wasps in general. The historical perspective of this section is particularly enlightening for readers who know little or nothing about insect or wasp behavior. Table 1-1 presents biological information at a single glance for this group of wasps. Chapter 2 reveals the major features of behavior common to most species of *Philanthus*, with emphasis on the European and African *P. triangulum*. The groundwork for subsequent chapters on individual groups and species is cemented together in Chapter 2, and many terms and concepts employed throughout the text are defined therein. Subsections entitled Habitat and Life History, Male Behavior, Female Behavior, Nest Structure, Provisioning, Natural Enemies and Economic Importance are so concisely written that they could serve as models for subsequent studies on these aspects of behavior in other groups of wasps.

Chapters 3, 4, 5 and 6 provide significant, detailed information on male behavior, burrow sharing, nesting behavior and natural enemies for 19 species in the *Philanthus zebratus*, *gibbosus*, *pacificus* and *politus* Groups, respectively. Each chapter is well illustrated with photographs and diagrams, and contains much tabular information. Certain aspects of the behavior of some of the species are covered thoroughly, e.g., male behavior in *P. bicinctus*, *P. basilaris*, *P. crabroniformis* and *P. pulcher*, and provisions of *P. zebratus* and *P. pulcher*. Chapter 7 utilizes the same approach and subheadings as Chapters 3-6 in treating five additional North American species of *Philanthus*. Evans and O'Neill place these five species in this chapter because they "form a diverse lot structurally" and are unrelated to species in Chapters 3-6. They indicate that these species had been assigned previously to four species-groups and perhaps the authors should have used these assignments here to conform to the ordering of the groups in Chapters 3-6. There appears to be enough behavioral information given to warrant tentative assignments despite the fact that Evans and O'Neill indicate that none of the species has been "thoroughly studied."

Chapter 8 furnishes a brief review of behavior of five Eurasian species of *Philanthus*, but only the widely distributed *P. triangulum*, the so-called beewolf of Europe and Africa, is treated in any detail. One of the strengths of this book is the chapter (9) entitled "An overview of male mating strategies." So few compilations on behavior in sphecid wasps have paid attention or given just due to the intricacies of male behavior and mating strategies; hence this chapter is extremely timely. A wide variety of subtopics treat little investigated yet highly interesting facets of the male's participation and contribution to the total behavioral picture in sphecid wasps. Particularly interesting and significant topics in this chapter include scent-marking, aggressive interactions, intraspecific body size and mating success, individual male tactics, associated costs and intersexual selection. Tables 9-1 and 9-2 bring together much information on male behavior and territoriality in other genera of sphecid wasps.

In Chapter 10 Evans and O'Neill synthesize existing information on the behavior of species of *Philanthus* and speculate on the evolution of behavior patterns within the genus in relation to what is known about the evolution of behavior in other

wasps. A series of tables and diagrams helps to explain variation in some of the individual behavioral components. This chapter concludes with a definition of ancestral and derived behavioral characteristics within the subfamily Philanthinae and a flow chart that depicts aspects of the evolution of male and female behavior in digger wasps.

This is a highly organized, well-written, easily readable book detailing the individual behavioral components of males and females of the sphecid genus *Philanthus*. It approaches the subject from the standpoint of evolution of behavior in digger wasps and is synthetic in scope, tying together a myriad of significant information ranging from scent marking, alternative mating strategies and body-size related to success in mating in males to construction of false burrows, nest aggregation and counter-cleptoparasitic behavior in females. Anyone with an interest in descriptive and evolutionary behavior, behavioral ecology or natural history will want to purchase, read and place this very informative and highly interesting book on their shelf.—*Frank E. Kurczewski, Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, Syracuse, New York 13210.*

LITERATURE CITED

- Evans, H. E. 1957. Studies on the Comparative Ethology of Digger Wasps of the Genus *Bembix*. Comstock Publ. Assoc., Ithaca, New York, vii + 248 pp.
- Evans, H. E. 1966. The Comparative Ethology and Evolution of the Sand Wasps. Harvard Univ. Press, Cambridge, Massachusetts, xvi + 526 pp.

Mostly Flies

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A Manual of Forensic Entomology.—Kenneth G. V. Smith. 1986. British Museum (Natural History) and Cornell University Press, 205 pp. \$39.95.

Smith has written an engaging and very readable primer on forensic entomology—the first in English. The aim of the author is to simplify complex material and to serve those with only an elementary knowledge of entomology. He succeeds with a style that is direct, engaging and lucid, perhaps best exemplified in the keys to the mainly European insect fauna found on corpses and the excellent diagnostic drawings. The book has chapters on the faunal succession on cadavers, methods and techniques, case histories, keys and illustrations of relevant Diptera species, and illustrations of species of Coleoptera, Hemiptera, Lepidoptera, etc., and even of Cannabis insects. The glossary is a useful adjunct.

One might conclude from a first reading that with an elementary knowledge of entomology and this manual, an individual would be ready to tackle homicide cases. Nothing could be farther from the truth. Indeed, a little knowledge could be a dangerous thing. Forensic entomology is a specialist field. It should not be practiced by persons with only an “elementary knowledge of entomology,” especially when lives may be at stake, as in homicide cases. The following will serve to illustrate some of the complexities involved and sophistication required.